ICT Impact on Firms: The Mediating Effect of Interorganizational Cooperation for Corporate Travel Agencies

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Abstract: The pandemic caused by covid-19 has paralyzed practically the entire tourism sector, so new mechanisms are required to reactivate it. This article analyzes inter-organizational cooperation as a mechanism through which information and communication technologies (ICT) influence firm performance of agencies in this sector. The data necessary for the empirical study was obtained through a questionnaire reported by managers/directors of 170 TMC (Travel Management Company) and DMC (Destination Management Company) agencies related to the tourism business and events in Brazil. The empirical results show that the ICT use for the management of events and businesses benefits cooperation between agencies, as well as obtaining better firm performance. Likewise, the mediation role of cooperation between the ICT use and the performance of the TMC and DMC agencies is confirmed. In other words, agencies of event management and business tourism, making use of new technologies, should reorient their behavior and establish different forms of cooperation among them (product or process development, benchmarking, exchange of experiences, ...) in order to mitigate the effects of the pandemic crisis and improve firm performance.

Key words: cooperation, ICT, performance, tourism, TMC/DMC
JEL codes: M10, M15

1. Introduction

In recent years, information and communication technologies (ICT) have gone from being a satisfactory and effective tool for leisure and work, to becoming totally necessary and essential in our lives, on a personal level, and mainly to a professional level. The global health emergency situation in which we have been immersed by the covid-19 crisis, has led to the massive use and in record time, of information and communication technologies in all sectors of activity. ICTs have provided the opportunity for companies and employees to continue working from remote locations, mainly from workers' homes. However, this health crisis has also had serious global economic consequences for all sectors of activity (Donthu & Gustafsson, 2020). The tourism sector, whether for leisure or

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professional purposes, has been one of the sectors most affected by the pandemic, due to the continuous restrictions on mobility during the last year and, possibly, it will be the sector with the slowest recovery (UNWTO, 2020).

Business trips have developed in recent years a wide industry of business tourism. MICE tourism (Meetings, Incentives, Conferences & Exhibitions) is carried out for professional purposes, and is related to the exchange of knowledge, industrial and technological development, educational exchange and the economic development of the cities where it takes place (García-López & Huete-Nieves, 2020), making it one of the main development engines of the services sector. The travel agencies specialized in business trips and event management have been called TMCs (Travel Management Company) and DMCs (Destination Management Company) and their importance lies in the economic impact and employment they generate. The spending of a business tourist is usually twice that of a tourist on vacation or pleasure (UNWTO, 2020). The health crisis has caused a 78% drop in the volume of tourists worldwide, with a loss of some $1.2 trillion in revenue and cuts of $120 million in direct tourism employment. Under this background, the TMC and DMC agencies rely on advanced information systems and high communication technology to adapt to the new market situation and focus on the client. Therefore, a new scenario arises in which in order to acquire resources and capabilities that provide new knowledge and ideas, the outsourcing of external professionals and/or cooperation with other firms is recommended. On the one hand, ICT is causing positive changes in the skills and behaviors of employees (García-Sánchez et al., 2018; Kumar, 2020), pushing greater productivity and cost reduction, due to the return on investment made in technology and knowledge, and due to the new management forms (Arshad & Siddiqui, 2020; Koçyiğit & Akkaya, 2020). So managers must facilitate and promote the ICT use among their employees to achieve better business performance. On the other, the flexibility that these external relationships provide through the use of technology resources could also directly influence firm performance. Previous empirical studies have confirmed that ICTs contribute to the organizational flexibility, by promoting a change in the nature of organizational boundaries in work performance and by helping firms respond to changing market conditions (Navío-Marco et al., 2018), at the same time that they contribute to modify organizational structures (Kretschmer & Khashabi, 2020; Perez-Valls et al., 2016). Organizational Flexibility is understood as a set of strategies that allow and enable companies to adapt to the environment (Bamel & Bamel, 2018). While implementing a more flexible agency model through the use of ICTs involves significant organizational transformations in the workplace, it might also stimulate the innovation in products and processes (Zouaghi et al., 2018). By improving communication, ICTs facilitate different and more versatile forms of cooperation among work groups inside and outside the firm, which generate improvements in efficiency and productivity (Yin et al., 2019). The capacity for innovation in processes and products helps to offer quality services to increasingly demanding clients, such as business tourists (travellers), incentives and events (Datta, 2020).

To date, there are no studies that demonstrate the relationship among ICT use, cooperation (as a measure of external flexibility) and firm performance in the travel agency sector. The empirical evidence is limited to studies of specific and innovative companies, which do not take into account neither the institutional and regulatory framework, nor the type of activity they carry out. In this context, the objective of this article is to analyze how cooperation can be a mechanism through which information and communication technologies influence the performance of TMC and DMC agencies in the sector of business tourism and event management.

This research makes three main contributions to the state of the art. First, it aims to contribute to the literature review on the external organizational flexibility and, specifically, of cooperation, the ICT use and their influence

on firm performance. Second, this research has been carried out for TMC and DMC agencies that belong to the segment of corporate travel, incentives and events (MICE). This segment of activity has great potential since, on one hand, it generates significant income in different destinations around the world and, on the other, it also drives the seasonal adjustment of destinations by increasing the demand for services. Third, the focus of attention is directed to TMC and DMC agencies from an emerging economy country (Brazil). The characteristics of companies in advanced countries are usually the most common reference for empirical studies of organizations and specifically of organizational flexibility. Although destinations in emerging economy countries represent a highly developed portion of business tourism and event management, there are hardly any studies that analyze the organization and structures of the tourism companies that operate within this market segment.

The following section is devoted to the theoretical framework. The paper continues with the sections methodology and results. Last, the conclusions, limitations and future lines of research are exposed.

2. Literature Review and Conceptual Model

2.1 ICTs and Inter-organizational Cooperation

The Technology Acceptance Model (TAM), proposed by Davis in 1989, explains the degree of adoption of technologies by firms. Davis suggested that one's beliefs, attitudes, or predispositions about technologies would influence their possible use. These predispositions are made up of two main variables: perceived usefulness and perceived ease of use. The original model has been expanded with new predictor variables, which have to be controlled to analyze the acceptance of each technology under study (Assaker, 2020; Go et al., 2020). Since then, the use and study of information and communication technologies have become essential due to the utility and value they generate in firms (Egger et al., 2020). At the same time, the study of ICTs by researchers has been determined by their own technological development in the eighties, but also by the needs and concerns of managers (Drnevich & Croson, 2013).

The effective use of ICTs enables greater productivity and a reduction in costs, not only due to the initial investment made in technology but also due to the investment in new forms of management (Ismail & Idris, 2006). In fact, ICTs are considered as organizational elements, such that they are part of the organizational structure. New technologies require new organizations and a new knowledge accumulation on the part of their agents. ICTs help reduce organizational complexity by facilitating access to information and knowledge, which shortens organizational processes. In this way, a causal relationship is established between technological change and organizational change.

In this way, corporate travel, incentive and event companies, such as TMC and DMC agencies, use advanced technologies and different technological resources for administrative management and in their external interactions and transactions. In addition to the technological resources of interactive communication (Web 3.0), they also implement intelligent information systems such as Business Intelligence (BI). Business Intelligence systems, which are advanced information systems, have the characteristic of capturing and allowing the analysis of commercial data in an intelligent way, supporting decision-making, as well as conducting market and environmental studies for the creation of new products and services, all based on analytical data. Business Intelligence systems offer to strategic managers and stakeholders a complete view of the organization, providing benefits such as the ability to make fast, accurate and reliable decisions (Abusweilem & Abualous, 2019), making it easier for managers to identify the competition, to plan and adopt new strategies according to the desired

commercial performance. For TMC and DMC agencies, these technological resources facilitate the integration of the different organizational systems, concentrating the information of each agency in a single database (Data warehouse), so that it can be visualized by the entire group of companies.

Recent studies associate firm performance with investment strategies of industry 4.0 based on ITC resources such as: cloud computing, augmented reality, multi-level customer interaction, advanced algorithms with big data, smart sensors, mobile devices, Internet platforms, location detection, advanced human machine and 3D printing, are examples of technology necessary to achieve an advanced level of operational effectiveness and productivity, as well as a higher level of automation in organizations (Haseeb et al., 2019; Lu, 2017). All these resources have been integrated into the management of corporate business travel agencies.

The need for a quick response to a dynamic and uncertain environment such as the current one, makes specialized knowledge a very valuable resource. Therefore, relationships among companies to obtain and to share knowledge are sometimes more important than relationships within the company (Ode & Ayavoo, 2020). Under this background, the external organizational flexibility is of vital importance. If cooperative relationships with other companies were not included in the study, the growth of alliances and other forms of inter-organizational relationships in many sectors would make it impossible to understand the behavior and results of the TMC and DMC agencies. In the TMC and DMC agencies, which by their own business management process interact with suppliers, corporate clients and other firms from different sectors, the inter-organizational relationship among partners will be more flexible due to their greater use of ICTs. The new needs in the TMC and DMC agencies will justify the extension of the organizational limits to the external environment through new relational forms, such as cooperation and the exchange of experiences, supported by the use of advanced ICTs. Thus, it is conceivable that the ease of access and communication favors more versatile forms of cooperation among stakeholders of TMC and DMC agencies.

These questions can be approached from the business theory based on knowledge, which is developed from the theory of resources and capabilities. Authors such as Nonaka and Takeuchi (1995), Grant (1996) and Teece (2000) suggest that since tangible resources are available in markets (a priori efficient) and knowledge is the most difficult resource to imitate and the most socially complex, the specific knowledge that a company possesses (and the capacity to create it) can positively differentiate it from its competitors. Knowledge exchange is essential in knowledge management, to contribute to the application of knowledge, innovation and also to the competitive advantage of an organization (Jackson et al., 2006). This knowledge exchange can occur through “face to face” or interactions by technological means (ICT), through knowledge management systems (McFadyen & Cannella, 2004; Voelpel et al., 2005), also called KMS (Knowledge Management Systems). Grant considered that an interesting feature of the knowledge-based approach was to offer a theoretical basis for understanding a number of emerging organizational innovations and trends, including the renewal of traditional organizational structures through disability and empowerment and development of new organization charts with horizontal structures based on teams and alliances between companies. While Grant includes alliances among companies, it has generally been assumed that firms develop these inimitable resources internally, however, the search for resources and value creation capabilities must extend beyond the limits of the company (Osorio-Gallego et al., 2016).

In addition to creating value for companies, the existing reasons for cooperating and/or outsourcing activities with other firms may be of a different nature. Sometimes the reason is that inter-organizational cooperation can positively influence the firm performance (Wilke et al., 2019). Other times, the reasons lie in the greater flexibility that the company obtains to transfer demand changes to its suppliers, to have the most advanced technologies in

rapidly evolving sectors or even to reduce the time required for the development and manufacture of new products (Tojeiro-Rivero & Moreno, 2019). On other occasions, companies cooperate motivated by the potential benefits of joint actions among partners, in order to increase their competitive advantages (Brito et al., 2014; O'Connor et al., 2020). Companies in changing environments, such as TMC and DMC agencies, may experience greater uncertainty in the design and scheduling of activities and may need greater access to relevant external knowledge and new skills and abilities from their internal employees. Due to the increasing importance of specialized knowledge and the imperative need to adapt quickly to changes in an environment that is also increasingly uncertain, relationships among firms, based mainly on knowledge, acquire an even greater importance than internal relationships (Ode & Ayavoo, 2020). Thus, business cooperation offers small and medium enterprises, such as TMC and DMC agencies, the opportunity to access resources that collectively empower them to face more complex challenges, such as obtaining technology and knowledge in areas they know, as well as in those that they are not specialized (Uman & Komson, 2019).

2.2 Interorganizational Cooperation as a mediating variable between ICTs and Performance

The literature about the importance of ICTs and their influence on firm performance is rich. Some studies show the importance of making better and more intensive use of ICTs to obtain better firm performance through innovation processes (Chege et al., 2019). Others focus on the effects of ICT use on improving firm performance, as well as its relationship with the factors that influence its adoption (Martínez-Sanchez et al., 2010). Others point out that, thanks to ICTs, there are new opportunities that strengthen markets in such a way that emerging communication channels improve the company-client relationship (Osorio-Gallego et al., 2016). With the effective use of ICTs, greater productivity and cost reduction are obtained, not only due to the initial investment made in technology but also due to associated investments in new forms of management, such as inter-organizational cooperation (Martin & Omrani, 2015). Business cooperation offers small and medium enterprises, such as TMC and DMC agencies, the opportunity to access resources that collectively empower them to tackle more complex challenges. Technological cooperation is necessary to take advantage of the company's ability to carry out new and unplanned activities in response to unpredictable changes in market demands or unique customer requests (Sánchez et al., 2019). In this sense, inter-organizational cooperation can positively influence firm performance (O'Connor et al., 2020; Zhang et al., 2020). Business cooperation increases competitive advantage (Martínez-Sánchez et al., 2011) and improves operational results.(Dong et al., 2020) Cooperative inter-organizational relationships allow companies to benefit from the assets of different partners, stimulating their growth and profitability (O'Connor et al., 2020).

Summarizing, the literature reflects how the use of ICTs enables inter-organizational cooperation, and how ICTs and cooperation positively influence firm performance. Therefore, this research considers whether, for TMC and DMC agencies, cooperation among companies, as a measure of external organizational flexibility, is a variable that helps to explain the positive relationship between their use of ICTs for events and business and their business results. Based on these arguments, the following research model is proposed (Figure 1):

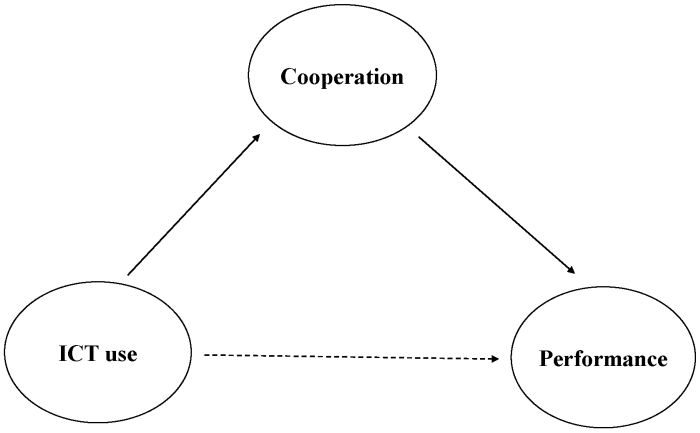


Figure 1 Conceptual Model

3. Methodology: Sample and Variables

3.1 Sample

The study sample consists of Brazilian corporate travel, incentive and event agencies, which are known as TMC and DMC agencies. For the data compilation, information was collected using different sources: ABRACORP (2015) (Brazilian Association of Corporate Travel Agencies), ALAGEV (2016) (Latin American Association of Corporate Travel and Event Managers), CADASTUR (2015) (Registry of the Brazilian Ministry of Tourism) and the list of the Corporate Travel Yearbook PANROTAS (2015, 2016) of the 2015 edition. DMC agencies from the list of Brazilian companies that participated in the 2015 Conference of IBTM (Incentive, Business and Travel Management) were added to the company database. The company database was completed with 47 new TMC agencies, which were added to the list of the Corporate Travel Yearbook PANROTAS of the 2016 edition. A structured questionnaire was prepared to collect information on the degree of use of ICTs, organizational flexibility practices and firm performance.

Data compilation took place between June 2015 and August 2016. Questionnaires were sent to 258 Brazilian tourism agencies, of which 237 are TMC agencies and 21 are DMC agencies. These agencies are located in all regions of Brazil (31 in the South, 184 in the Southeast, 3 in the North, 33 in the Northeast and 7 in the Center-West). São Paulo with 132 agencies and Rio de Janeiro with 34 agencies, both located in the Southeast region, are the provinces with the highest number of agencies. Taking into account the number of valid questionnaires received, the final sample is made up of 170 TMC and DMC agencies. This sample size represents a response rate of 66%, with a sampling error of 4.4% at a 95% confidence level, which is considered a satisfactory response rate depending on the size of the population.(Baruch & Holtom, 2008)

Regarding the characteristics of these agencies, 34% have fewer than 10 employees, 47% have between 10 and 50 employees, 14% have between 50 and 250 employees and 5% have more than 250 employees. Half of these agencies have been operating for less than 20 years (25% less than 10 years and 25% between 10 and 20 years), 34% have been operating between 20 and 30 years and 16% over 30 years. TMC and DMC agencies in the Brazilian segment of business tourism and event management can carry out more than one activity simultaneously, thus 78% perform activities in the management and planning of corporate travel, and 70% in event-related

services. With respect to annual gross billing, and following the classification of the SEBRAE[1] (Brazilian Support Service for Micro and Small Companies), the largest number of TMC and DMC agencies correspond to small and medium/large enterprises, since little more than 74% of the agencies show an annual gross turnover for an amount greater than R$360,000.00.

To justify the adequacy of the selected scales in the study of the mediating role of cooperation in the relationship between the ICT use and firm performance of tourism agencies, a validation of the measurement scales was carried out. The quantitative validation guarantees the reliability of the measurement instruments, allowing the identification of the dimensionality of each of the scales and, ultimately, the validity of the scales for the variables: ICT use, Cooperation and Performance. In this validation process, the scales were refined from several exploratory factor analyses, using the SPSS statistical program, and from confirmatory factor analysis, using the EQS program, version 6.1 for Windows. To analyse the mediating effect of cooperation in the relationship between the ICT use and firm performance, Structural Equations methodology is recommended when one or more variables are not directly observable, which implies assuming measurement errors (Cheung & Lau, 2002; Iacobucci et al., 2007).

To analyze the mediating effect of cooperation, three stages were designed, with three corresponding models.(Holmbeck, 1997; Jiménez et al., 2008) In the first stage, a direct effects model is proposed to analyze the relationship between ICT-Performance. This model must obtain an acceptable fit and the relationship must be statistically significant. In the second stage, an indirect effects test is carried out. This test consists of evaluating the fit of the ICT-Cooperation-Performance model (restricting the relationship ICT-Performance of first stage to zero). In the third stage, a mediator effect model (not restricted) is proposed, which considers the joint model with the three relations ICT-Performance, ICT-Cooperation and Cooperation-Performance. If the plausibility test reveals significant differences between the restricted model and the unrestricted model, the unrestricted model is accepted and it can be concluded that there are no mediating effects. On the other hand, if there are no differences between the two models, the restricted model is chosen, which dispenses with at least one parameter, which shows the existence of mediating effects. In addition, this joint model must have adequate adjustment values, and the relationships ICT-Cooperation and Cooperation-Performance must be statistically significant.

3.2 Variables

To carry out the proposed methodology, the following three constructs have been used: “ICT”, “Performance” and “Cooperation” (Table 1).

The “ICT” construct measures the degree of use of Business Intelligence and Event Management Systems in TMC and DMC agencies. This construct consists of two items adapted from Buhalis and Law (2008), Martins and Murad (2010, 2015). These items were measured using a seven-point Likert scale, with a correlation among items of 0.499.

The “Cooperation” construct measures the level of external cooperation of the TMC and DMC agencies. This construct consists of five items adapted from Michie and Sheehan (2005) and Brito et al. (2014): cooperation in training and conferences, in product or service development, in process development, in benchmarking and exchange of experiences, and in transfer of information and communication technology. These items were

[1] SEBRAE - Serviço Brasileiro de Apoio às Micro e Pequenas Empresas. Annual gross turnover (in R$) up to R$ 60,000.00 (9,640.00 € aprox.) = “Individual microentrepreneur”, from R$ 60,000.01 to R$ 360,000.00 (57,827.00 € aprox.) = “Micro company”, from R$ 360,000.01 to R$ 3,600,000.00 (578,276.00 € aprox.) = “Small company” and more than R$ 3,600,000.01 = “Medium/Large company”.

measured using a seven-point Likert scale, with a correlation among items over 0.50.

Table 1 Constructs, Dimensions, Measures and Factor Loadings

Constructs	Alpha de Cronbach	Dimensions	Description	Factor Loadings	IFC	AVE
ICT Use	0.664	Events and business	Event Management System	0.58**	0.704	0.556
			Business Intelligence Systems (BI)	0.90**		
Cooperation (External organizational flexibility)	0.882	Cooperation among companies in…	Training/Conferences/Seminars	0.75**	0.881	0.599
			Development of products and services	0.79**		
			Development of processes	0.82**		
			Benchmarking and exchange of experiences	0.73**		
			Transfer of ITC	0.80**		
Performance	0.879	External relationships with	Suppliers	0.60**	0.880	0.712
			Customers	0.87**		
			Satisfied customers	0.73**		
		Financial results	Profitability on sales	0.93**		
			Global financial result	0.86**		
		Innovations	Process innovation	0.80**		
			Product and/or service innovation	0.91**		

**p < 0.01

The "Performance" construct, according to Ketkar and Sett (Ketkar & Sett, 2010) measures financial results (Bhattacharya et al., 2005; Gilley & Rasheed, 2000), results in relationships with clients and suppliers (Guest, 1989; Michie & Sheehan-Quinn, 2001) and innovation (Arvanitis, 2005; Kelliher & Riley, 2003) in TMC and DMC agencies. The variable "Performance" consists of 7 items, grouped in three dimensions, and refers to the results of the agencies compared to similar companies in their sector. These items were measured using a seven-point Likert scale. The three dimensions explain 81.47% of the total variance, and all the communalities of the observed variables exceed 0.50. The Kaiser-Meyer-Olkin (KMO) test is close to 1 and the Bartlett sphericity test shows the significance level below 0.05. The dimensions identified are those related to External Relations, Financial Results and Innovation. Table 2 shows the value of the statistics and the goodness-of-fit indices of the scale.

Table 2 Statistics and Indices of Goodness of Fit of the Model – Performance – First Order

Estimate Model	g.l.	χ^2 S-B	RMSEA	SRMR	NFI	NNFI	IFI	CFI	PNFI
Performance (1º orden)	12	14,2399	0.033	0.057	0.970	0.991	0.995	0.995	0.654

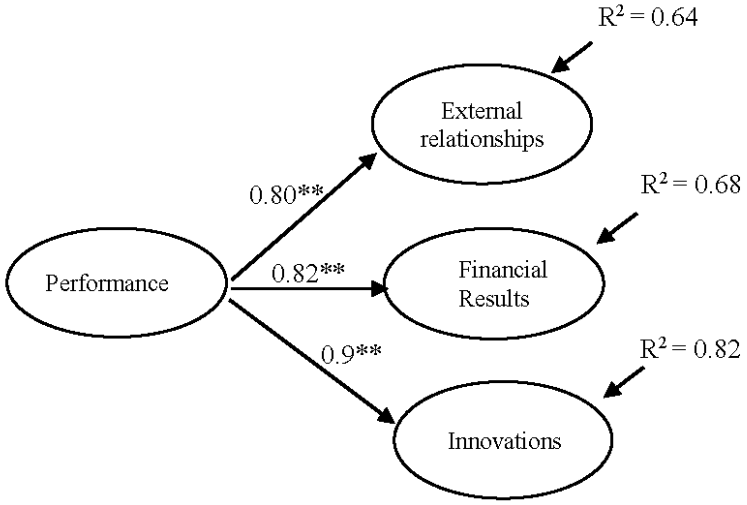
According to the matrix of correlations among the corresponding dimensions of these three groups of Results (Table 3), the possibility that there is a second-order variable that considers the three dimensions is not ruled out.

Table 3 Correlations Between Dimensions Of Results

	External Relationships	Financial Results	Innovations
External Relationships	1		
Financial Results	0.66**	1	
Innovations	0.72**	0.75**	1

**p < 0.01.

Figure 2 shows the factor loadings of the variables that figure out the "Performance" construct, the coefficients of determination (R2) and the model goodness of fit.



Model Fit Indices: significance level: **p < 0.01; g.l. = 12; χ2 (Satorra-Bentler) = 14,2398; RMSEA = 0.033; SRMR = 0.057; NFI = 0.970; NNFI = 0.991; IFI = 0.995; CFI = 0.995; PNFI = 0.654.

Figure 2 Second-order Model of Performance

From the results (Figure 2), two main conclusions can be inferred for the TMC and DMC agencies. First, the representative variables of the results come from three dimensions: External Relations, Financial Results and Innovation. Second, these three dimensions can be considered as a whole or joint actions, which make up the performance.

Table 4 is devoted to the descriptive statistics of the three constructs, as well as the correlations among them.

Table 4 Statistics of the Variables: Mean, Standard Deviation and Correlations

Variable	Mean	SD	TIC use	Cooperation
TIC use	2,368	2,361	-	-
Cooperation	2,559	1,861	0.513**	-
Performance	4,960	1,336	0.257**	0.400**

**p < 0.01

4. Results

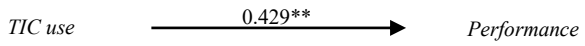
In the first stage of the analysis, the Direct Effects Model (Figure 3a) reveals the existence of a significant relationship between the ICT use and the firm performance of business tourism and event management agencies. In Figure 3a, statistics and the measures of goodness of fit indicate good explanatory power of the model. Also, the probability of the value of χ2 with respect to the required degrees of freedom is 0.14756 (greater than 0.05). The model explains the 13.8% variance of the performance of the tourism agencies.

Then, the cooperation variable is included, at the same time that the direct relationship between the ICT use and firm performance of the TMC and DMC agencies is assumed equal to zero. The Indirect Effects Model (Figure 3b) reveals that the relationships among variables are statistically significant. For this model, statistics and

measures of goodness of fit indicate a good fit of the model. The probability of the value of $\chi 2$ with respect to the required degrees of freedom is 0.06403 (greater than 0.05). The model explains the 23.1% variance of the performance.

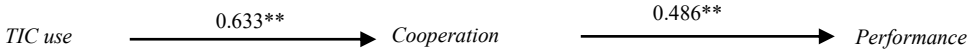
Lastly, the final model, Mediating Effects Model, includes both the mediating factor (cooperation) and the direct relationship between the ICT use and the firm performance of the TMC and DMC agencies (Figure 3c). The model presents an adequate goodness of fit, also obtaining a probability of the value of $\chi 2$ with respect to the required degrees of freedom is equal to 0.0589 (0.05). The model explains 23% of the variance of the agency results. To check if this model provides any improvement in the goodness of fit with respect to the Indirect Effects Model, both models were compared by calculating the difference of the $\chi 2$ statistics. The result of this test was not statistically significant, which indicates that there are no differences between both models ($\Delta \chi 2(1.170) = 0.44$). This means that the Mediating Effects Model, the direct relationship between the ICT use and firm performance of the TMC and DMC agencies in the mediator model, does not provide significant improvements in the adjustment, with respect to the Indirect Effects Model in which the direct relationship was restricted.

In addition, Figure 3c shows that when inter-organizational cooperation is introduced in the analysis, the direct relationship between the ICT use and firm performance is no longer significant, as a consequence of the total mediating effect exerted by the cooperation between both variables.



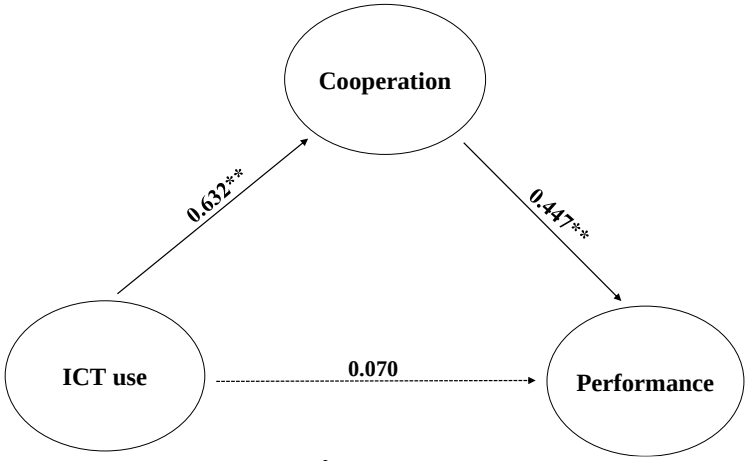
Measures of goodness of fit: significance level: **p < 0.01; $R^2 = 0.138$; g.l. = 37; $\chi 2$ (Satorra-Bentler) = 45.9912; RMSEA = 0.038; SRMR = 0.043; NFI = 0.934; NNFI = 0.978; IFI = 0.986; CFI = 0.986.

Figure 3a Direct Effects Model



Measures of goodness of fit: significance level: **p < 0.01; $R^2 = 0.231$; g.l. = 96; $\chi 2$ (Satorra-Bentler) = 117.9061; RMSEA = 0.037; SRMR = 0.056; NFI = 0.907; NNFI = 0.976; IFI = 0.981; CFI = 0.981.

Figure 3b Indirect Effects Model



Measures of goodness of fit: significance level: **p<0.01; $R^2 = 0.230$; g.l. = 95; $\chi 2$ (Satorra-Bentler) = 117.4653; RMSEA = 0.037; SRMR = 0.055; NFI = 0,908; NNFI = 0.975; IFI = 0.981; CFI = 0.980.

Figure 3c Mediating Effect of Inter-Organizational Cooperation

A further analysis was performed to check the significant mediating effect. For this, Aroian's version (1947) of the Sobel test (Sobel, 1982) suggested in Baron and Kenny(1986) was used, in which the condition that the product of the standard errors is infinitely small is not assumed. The results confirm that the observed mediator effect is significant ($z = 3.72$; $p < 0.001$).

Summarizing, the results obtained accept the hypothesis that cooperation is a mediating variable between the ICT use and firm performance of the TMC and DMC agencies. Therefore, it is confirmed that business cooperation constitutes an explanatory factor in the relationship between the ICT use and firm performance of the TMC and DMC agencies.

5. Conclusions and Limitations

The activity of the business tourism sector, with an impact on the economy far greater than the obtained from the leisure tourism sector, has decreased notably in the last year due to the current global pandemic (UNWTO, 2020). This research proposes that the TMC and DMC agencies, taking advantage of the use of advanced ICT, should establish cooperative relationships with other companies to share knowledge and skills in order to cope with the current crisis situation and improve their performance.

This article aims to examine the role of cooperation, as a measure of external organizational flexibility. Our results support the mediating role of inter-organizational cooperation between the ICT use and commercial results of business tourism and event management agencies. The study was carried out with a sample of travel agencies in Brazil, specialized in business trips and events: TMC (Travel Management Company) and DMC (Destination Management Company).

This research demonstrates that the use of advanced ICTs, such as those used for the management of events and businesses in the field of tourism, has become essential to generate better firm performance (García et al., 2018). New technologies have become an effective tool for knowledge transmission and for decision-making in companies, which in general, drive better firm performance.

The use of these ICTs generates opportunities to improve the company-client and company-supplier relationships (Osorio-Gallego et al., 2016), in addition to promote the cooperative relationship among other types of companies given the ease of communication. One of the reasons that these agencies establish cooperative relationships with external suppliers and other types of companies lies in obtaining advanced technology and knowledge in areas in which they are not specialized, as well as in other areas in which sharing and cooperating is profitable in economic terms. Additionally, the current instability and uncertainty of the environment makes TMC and DMC agencies need greater for access to relevant external knowledge and new internal skills and capacities, for which cooperation has become an essential factor for this type of firms. The demand for specialized knowledge and the need to adapt quickly to the demands of the environment, makes cooperation with other companies in the sector in knowledge-based activities decisive. Thus, the ease of communication provided by ICTs favors cooperation among work groups inside and outside the agencies, generating improvements in efficiency and productivity, as well as in organizational flexibility (Yin et al., 2019), which makes them more adaptable to changing environmental conditions (Navío-Marco et al., 2018).

Following this line of argument, our study shows that the use of advanced ICTs for business tourism and event management will favor business cooperation in many ways (conferences, seminars, benchmarking, knowledge creation, experience exchange and products, services or processes development, among others), and

will positively influence the performance of these agencies. The inter-organizational relationship among partners will be more flexible due to the greater use of advanced ICT resources, which is one of the main characteristics of these companies, constituting an explanatory factor of the positive effect of these ICTs on the performance of the TMC agencies and DMC. In other words, the use of ICTs for event and business management encourages the use of external practices of organizational flexibility, specifically inter-organizational cooperation, which in turn is an important predictor of firm performance of the TMC and DMC agencies.

The results obtained in this research are useful for the executives of the TMC and DMC agencies in order to encourage investments in technology and to promote the use of advanced ICTs for event and business management. The ICT use in the daily operation of TMC and DMC agencies and in corporate travel management reinforces their employees' professional skills and organizational behaviors (García-Sánchez et al., 2018; Kumar, 2020), which improves labour productivity and reduces costs. Given the positive return on investment in technology and knowledge, and in new forms of management (Arshad & Siddiqui, 2020; Koçyiğit & Akkaya, 2020), CEOs should facilitate and promote not only the use of ICTs in their companies, but also and from human resources. field, they should support the building of multifunctional work teams with autonomy and responsibility in decision-making. Multifunctional work teams promote the exchange of skills and knowledge that help to take advantage of synergies and make the use of these ICTs profitable for better business performance. ICT will facilitate, on one hand, the strengthening of relationships with customers and suppliers, and on the other, the obtaining of knowledge and skills through relationships with other companies.

Among the main limitations of this research, which constitute future lines of research for the authors, include the use of cross-sectional data and a structured and closed questionnaire, which has limited the time to delve into the causal relationships between variables. Future studies should use longitudinal data to confirm the direction of causality. A qualitative design of the research would also help to better understand the relationships among the ICT use, cooperation and firm performance. In addition, the sample size is small, which is a limitation for the use of certain statistical techniques and the significance of the relationships. However, given that the response rate is relatively high, the sample is considered an adequate representation, at least for the analyzed sector. Future studies could consider larger samples to test validity in a greater number of sectors. The use of directive insights to evaluate agency performance can also be seen as a limitation. Future studies could incorporate subjective evaluations of employees in order to get a better picture of the reality.

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